REMARKS

Summary of Changes Made

The application was filed with 14 claims. In previous amendments, claims 3, 9 and 11 were canceled, and all remaining claims except claim 2 were amended. Presently, claims 7, 8, and 12 are canceled, and claims 1, 2, 4-6, 10, 13 and 14 are amended. New claims 15-18 are added. Accordingly, claims 1, 2, 4-6, 10, and 13-18 (12 claims) remain pending. No new matter is added by this amendment.

Claim Rejections - 35 U.S.C. §102(e) or 103(a) - (Chopin)

The Examiner has rejected claims 1, 2, 4-6, and 12-14 under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chopin, U.S. 6,740,312, ("Chopin"). The Examiner contends that Chopin teaches a method of making titania by subjecting a titanium salt solution to hydrolysis by heating under the presence of a carboxyl group or a carbonyl group, and then further carrying out heat treatment with an acid. The Examiner further contends that Chopin teaches that the solution is boiled and that it may be acidic.

The Examiner concedes that Chopin fails to expressly teach the product limitations of claim 1. However, presenting no technical augmentation, the Examiner merely presumes that the prior art products are identical or substantially identical, or are produced by identical or substantially identical processes and shifts the burden of proof to Applicant to establish that the prior art products do not necessarily or inherently possess the characteristics of the instantly claimed products, citing *In re Best*, 195 USPQ 430.

Initially, the Examiner will note that that claim 12 has been canceled thus rendering moot the rejection thereof.

To the extent that they are applicable herein, Applicants incorporate by reference the arguments presented in the Amendment filed 4 February 2008 (at pages 9-12) relative to Chopin as if fully restated herein, keeping in mind that claims 7 and 12 have been canceled.

The Examiner will note that claim 1 has been amended to recite a method of protecting against ultraviolet light comprising providing a porous titanium oxide powder that is formed from titanium oxide primary particles agglomerated together, said primary particles having a mean diameter of 0.01 to 100 microns, the porous titanium oxide powder having a specific

surface area of 327 to 500 m^2/g; wherein the powder has an approximately spherical shape with the ratio of the minor axis to the major axis being at least 0.75. Chopin fails to disclose the limitations of claim 1. Further, the references to particle specific surface areas cited by the Examiner are to the "starting anatase titanium dioxide particles [,which] must exhibit a size of at most 100 nm, a BET specific surface of at least 200 m^2/g and a relative density of the order of 2.5," column 4, lines 34-35. However, the final product is a coated TiO_2 particle having a diameter of 100 nm and a specific surface area of only 10 m^2/g. Accordingly, the presently claimed particles and method differ from those of Chopin.

Chopin's titanium dioxide particles are dispersed in a medium, an aqueous dispersion. At no point is the powder isolated from the dispersion. Indeed, the purpose and focus of Chopin is to prepare a stable dispersion of titanium dioxide particles, which particles are also coated with a layer that can be a metal oxide, a metal hydroxide, or a metal hydroxide-oxide. The presently claimed particles and powders lack such a coating, and are isolated and removed from the reaction mixture and not dispersed in anything. Based on the foregoing, it is believed that claims 1, 2, 4, and 5 are patentable over Chopin.

With respect to claim 6, in the process of manufacturing Chopin's dispersion, the titanium oxide is produced from an organic titanium salt such as a titanium alkoxide. It is noted that in the amended process claims of present invention, titanium oxide is produced from an inorganic titanium salt. Chopin teaches a method of making titania by subjecting an organic titanium solution to hydrolysis in the presence of an acid having either (a) a carboxyl group and at least two hydroxyl or amine groups or (b) at least two carboxyl groups and at least one hydroxyl or amine group. Nowhere in the present invention is it disclosed or suggested that an acid including a hydroxyl or amine group is used. Further, nowhere in Chopin is the use of a polyhydric alcohol disclosed. Further, Chopin does not use a polyhydric alcohol to prepare the titanium dioxide particles therein. Applicants recognize that if the hydrolysis is conducted without polyhydric alcohol (as in the disclosures of Chopin), the resulting powder is aggregated, which in turn results in a small surface area compared to that of the instantly claimed particles as noted in comparative example 2 of the present invention.

Applicants further note that, because Chopin's titanium oxide is covered with a layer made of a metal oxide, a metal hydroxide or a metal hydroxide-oxide, that the surface area is not, and cannot be, as great as that of the presently claimed particles

Claim 6 has been amended to recite that the titanium salt used is inorganic and that the alcohol is polyhydric. Chopin fails to disclose or suggest these limitations, hence claim 6 is patentable over Chopin.

New claims 15-18, of which claims 15 and 17 are independent, are added herein and asserted to be patentable over Chopin in all respects. Claim 15 recites "A method of manufacturing a spherical porous titanium oxide powder used for protecting against ultraviolet light, comprising (a) subjecting an inorganic titanium salt solution to hydrolysis by heating in the presence of glycerol and acetic acid, and (b) heat treating with an acid. Nowhere does Chopin disclose or suggest the use of glycerol in the hydrolysis. Hence claim 15, and its dependent claim 16, are patentable over Chopin.

Though in independent form, claim 17 is a more detailed version of claim 6. Claim 17 recites, in addition to the limitations of claim 6, that the inorganic titanium salt solution has a concentration of 0.1 to 5 M, that the heating is for 1 to 12 hours at a temperature of 50 °C to 100 °C in the presence of a polyhydric alcohol and a substance having a carboxyl group or a carbonyl group, filtering to isolate the resulting product residue, redispersing the product residue in water to form a slurry, filtering to isolate the resulting product, washing the product with water, redispersing the product in water, adjusting the slurry pH to 6 to 8 with alkali, and heat treating the slurry with an acid." These limitations can be found in the specification as originally filed at page 7, line 16 through page 9, last line. Chopin fails to disclose or suggest all such limitations. Applicants assert the patentability of claim 17 over Chopin.

Claim 18 recites the spherical shaped porous titanium oxide powder produced by the process of claim 6. Based on the asserted patentability of claim 6, Applicants assert the patentability of its new dependent claim 18.

Claim Rejections - 35 U.S.C. §102(e) or 103(a) - (Domen)

Claims 1, 2, 4-8, 10, and 12-14 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Domen US 2003/0162658, ("Domen"). The Examiner contends that Domen teaches a process of making spherical shaped titanium oxide. The titanium dioxide is formed by mixing a titanium compound, at least one compound selected from glycols and alcohols and a polyhydric carboxylic acid. The resulting

mixture is heated. The Examiner admits that Domen fails to expressly teach all the product limitations of claim 1, but relies on the reasoning in *In re Best*.

The Examiner will note that claims 7, 8, and 12 are canceled herein, thus rendering the rejections thereof moot. Claims 1, 2, 4, 6, 13, and 14 are amended herein to fall outside the disclosures and suggestions of Domen.

The purpose of Domen's titanium oxide is to produce high photocatalytic activity by irradiation with visible light, so it is necessary to add a compound containing elements selected from the group consisting of IIa group elements, IIb group elements and lanthanides to the reaction mixture of Domen, paragraphs 29-34. Domen teaches in paragraph 65 the production of titanium oxide by mixing a glycol or an alcohol and a polyhydric carboxylic acid, but because of the presence of a compound containing an element selected from a group consisting of group IIa elements, group IIb elements and lanthanides, as well as the fact that the reaction is heated to a temperature as high as 650 °C. For the foregoing reasons, as is readily apparent to the skilled artisan, Domen's process will result in particles that do not have a high surface area like the instantly claimed powders. Accordingly, a relatively smooth particle surface will result. Further, Domen's product may take on a variety of shapes such as "bar, plate, rectangular solid or the like," as well as spherical, paragraph 37, so when taken as a whole, the disclosures and suggestions of Domen do not lead to the present invention. Based on the foregoing, Applicants respectfully request withdrawal of the rejections of claims 1, 2, 4-6, 10, 13, and 14.

Applicants assert the patentability of new claims 15-18 over Domen for the reasons set forth above. Domen fails to disclose or suggest all of the limitations of claims 15-18.

Claim Rejections - 35 U.S.C. §102(b) or 103(a) - (Olson)

Claims 1, 2, 4, and 5 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Olson, U.S. 4,732,750, ("Olson"). The Examiner contends, in a single sentence, that Olson teaches spherical titania with a surface area of about 300 m^2/g, which would include a surface area of 327 m^2/g.

The Examiner contends that Olson teaches a spherical titania (Column 1 lines 40-45) with a surface area of "about 300m^2/g", but it is produced from an organic titanium salt solution such as titanium alkoxide. It is concerned with the production of monodisperse titania particles from an alcoholic solution of titanium tetraalkoxide (an organic compound) containing an amine,

column 3 line 44-50. Titanium powder produced from titanium alkoxide by hydrolysis is tend to aggregate, Olson uses amines and add to the alcohol solution of titanium tetraalkoxide, column 3, lines 20-35, and 45-50.

Initially, Olson fails to disclose or suggest a method of protecting against ultraviolet light. Next, as noted at page 7 of the present invention, an inorganic titanium salt such as titanium sulfate, titanyl sulfate or titanium tetrachloride is suitably used. The instantly claimed powder and process is therefore significantly different from that of Olson's disclosure, which uses organic titanium salts. Olson uses only monohydric alcohols in the reaction to make titanium oxide particles, and such alcohols must contain no greater than 500 ppm of water. This is a critical limitation of Olson not recited or suggested in the claims and disclosures of the present invention. No such restriction is placed on the alcohols used to make the presently claimed particles, and the presently claimed methods involve the use of polyhydric alcohols.

Olson further discloses, at column 5, lines 45-60, that,

> [A]mine additives, in addition to controlling the relative sphericity of the powder particles, are extremely effective in controlling the average particle size of the precipitated powder. Simply changing the concentration of an amine containing additive may result in an increase or decrease in the average size of the titania particles, while still preserving the narrow size distribution of the powder. This size change is achieved while keeping both the water and alkoxide reagent concentrations (as well as other reaction conditions) constant and represents a fundamental advance in the processing of these materials which was not obvious and represents a significant advance over the processes heretofore known. [ ] [I]t is clear that size control additives are critical to the success of the reaction schemes described within.

The use of amine additives to control particle size in Olson is critical, and the particles and processes herein lack such amines.

Further, applicants strongly disagree that a surface area of 327 m^2/g is "about 300 m^2/g" as contended by the Examiner. Applicants would agree that "about 300" includes a range that differs from 300 by, say 1%. Applicants do not agree that "about 300" includes a value that deviates from 300 **by nearly 10%.**

Further still, spherical titania produced from organic titanium solution such as titanium alkoxide tend to aggregate and result in particles having significantly lower surface area than that of the present invention. Such phenomenon can be demonstrated by comparative examples, which the Applicants are prepared to provide in any response to a further Office Action.

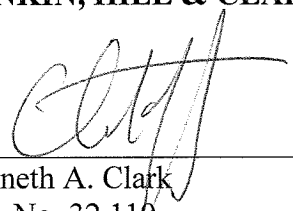
Based on the foregoing, Applicants assert the patentability of claims 1, 2, 4, and 5 over Olson and respectfully request withdrawal of the rejection.

CONCLUSION

Based on the foregoing, the Applicants respectfully request entry of the instant amendment and a Notice of Allowability for claims 1, 2, 4-6, 10, and 13-18. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application. If there are any additional fees resulting from this communication, please charge the same to our Deposit Account No. 18-0160, our Order No. SHD-18094.

Respectfully submitted,

RANKIN, HILL & CLARK LLP



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